

Solar thermal shining as potential electricity source

Investors bet a 1,000-acre California plant with 550,000 mirrors will produce power at a cost below coal.

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Along a dusty two-lane highway in California's Mojave Desert, 550,000 mirrors point skyward to make steam for electricity. Google Inc., Chevron Corp. and Goldman Sachs Group Inc. are betting this energy will become cheaper than coal.

The 1,000-acre plant uses concentrated sunlight to generate power for as many as 112,500 homes in Southern California. Rising natural gas prices and emissions limits may make solar thermal the fastest-growing energy source in the next decade, say backers including Vinod Khosla, the founder of computer maker Sun Microsystems Inc.

Costs for the technology will fall below coal as soon as 2020, the U.S. government estimates. JPMorgan Chase & Co. and Wells Fargo & Co. invested last year in the biggest solar plant built in a generation; Chevron and Google are funding research; and Goldman Sachs is seeking land to lease as demand outpaces wind turbines and geothermal.

"Solar thermal can provide a substantial amount of our power, more than 50 percent," says Khosla, who along with the Menlo Park, Calif., venture capital firm Kleiner Perkins Caufield & Byers, led a \$40 million investment in solar power producer Ausra Inc. "This is an industrial-strength solution."

Developers still need to overcome limited power lines and the need for energy storage systems, while lobbying for the extension of tax credits.

"They have to prove their technology," says Reese Tisdale, senior analyst at consulting firm Emerging Energy Research, which estimates solar thermal will lure more than \$85 billion in investments by 2020. "There need to be some significant technology jumps."

Unlike photovoltaic solar panels that convert sunlight to electricity, solar thermal focuses sunrays with mirrors to heat oil in glass pipes to about 700 degrees Fahrenheit (370 degrees Celsius). The oil turns water to steam, which spins an electric turbine.

Nine solar thermal plants built in the California desert from 1985 to 1991 still operate, with Juno Beach, Fla.-based FPL Group Inc. running seven. They have combined capacity of 354 megawatts, enough to power 230,000 Southern California homes.

At FPL's solar thermal site in the Mojave, 90 miles northeast of Los Angeles, sunshine beats down 340 days a year. The parabolic reflectors have an efficiency of more than 90 percent, compared with 80 percent for a typical bathroom mirror.

"There's always been a solar resource here," says Harvey Stephens, a production manager and one of 100 workers at the plant. "It's just that it hasn't been cost-effective enough."

At noon on a typical workday, technicians in a two-story control room monitor a dozen screens showing the heat generated by each array of mirrors. As temperatures creep past 700 degrees, icons blink to red from green, indicating the center is ready to feed electricity to the California grid.

Solar power "fits with our peak demand very well as long as the sun is cooperating," says Michael Yackira, chief executive of Sierra Pacific Resources, the company that owns utilities serving Las Vegas and other Nevada cities. "When it's cloudy, when it's raining, when it's dark, it doesn't produce power."

A solar thermal unit that begins operation in 2010 will produce power at 14.2 cents a kilowatt hour, almost triple the 4.8 cents for a plant using pulverized coal, the Energy Information Administration estimates.

Costs for solar thermal may fall as low as 3.5 cents a kilowatt hour by 2020, according to a report commissioned by the U.S. Energy Department.